CANCER THERAPIES USING ENGINEERED MONOMERIC FC MOLECULES

SUMMARY

The National Cancer Institute, Nanobiology Program seeks parties to co-develop cancer therapeutics base on antibody fragments.

REFERENCE NUMBER

E-019-2012

PRODUCT TYPE

- Therapeutics

KEYWORDS

- neonatal Fc receptor
- FcRn
- mFc
- IgG1
- mAbs

COLLABORATION OPPORTUNITY

This invention is available for licensing.

CONTACT

John D. Hewes
NCI - National Cancer Institute
240-276-5515

John.Hewes@nih.gov

DESCRIPTION OF TECHNOLOGY

The National Cancer Institute, Nanobiology Program seeks parties interested in collaborative research to co-develop engineered molecules therapies.

Efforts to engineer antibody-based therapeutics, to date, have encountered technical limitations due to the relatively large fragment size and short fragment half-life. Antibody fragments are emerging as promising biopharmaceuticals because of their relatively small size and other unique properties. However, compared with full-size antibodies, these antibody fragments lack the ability to bind to some Fc receptor and have reduced half-lives.

NCI scientists have developed small (□27 kDa) antibody fragments that are potentially useful for therapeutic development. These are monomeric IgG fragment (mFc) compositions; they have long half-

lives, are functional (pH dependent binders of neonatal Fc receptor - FcRn); soluble, and they express in *E. coli* efficiently. The molecules may serve as a platform for development of engineered mFc-based antibodies and fusion proteins with therapeutic applications: the smaller size may allow for superior access to targets and tissues compared to full sized mAbs and larger fragment-based therapeutics, while also retaining important functional characteristics. The IgG Fc is a dimer of two constant domains (CH2-CH3 chains). The Fc has a long half-life, which makes it promising as a candidate for engineering antibody therapeutics.

POTENTIAL COMMERCIAL APPLICATIONS

Therapeutics - human and veterinary, engineered antibody and fusion proteins.

COMPETITIVE ADVANTAGES

- Smaller size results in reduced steric hindrance
- Increased therapeutic efficiency

INVENTOR(S)

Dimiter S. Dimitrov (NCI) and Tianlei Ying (NCI)

DEVELOPMENT STAGE

- Discovery (Lead Identification)

PUBLICATIONS

Ying T, et al. Soluble monomeric IgG1 Fc. J Biol Chem. 2012 Jun 1; 287(23):19399-408. [PMID 22518843]

PATENT STATUS

- **U.S. Filed:** U.S. Patent Applications 61/063,245 01/31/2008 and 12/864,758 (0107/2010)

THERAPEUTIC AREA

- Cancer/Neoplasm